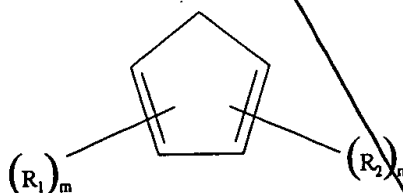
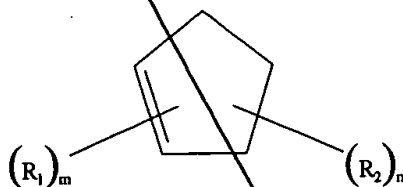
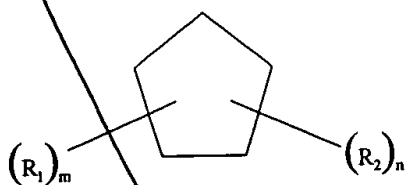


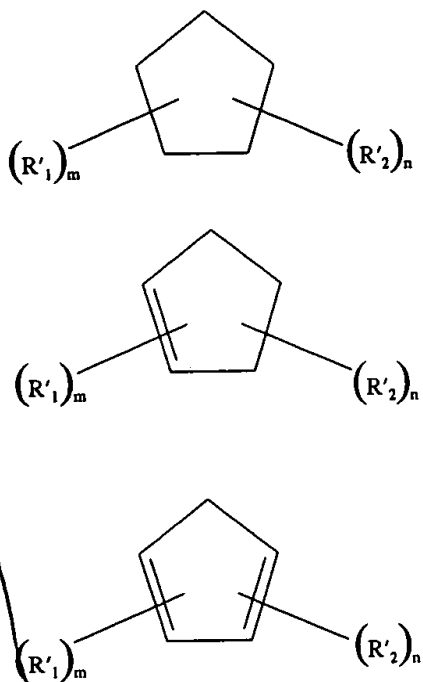
1. A magnetic recording medium, comprising:
a non-magnetic support;
a magnetic layer formed on the support; and
a lubricant layer over the magnetic layer, the lubricant layer including a compound selected from the group consisting of hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, hydrocarbyl-substituted cyclopentadiene, and mixtures or derivatives thereof.

2. The magnetic recording medium of claim 1, wherein the lubricant layer includes a hydrocarbyl-substituted cyclopentane, a hydrocarbyl-substituted cyclopentene, or a hydrocarbyl-substituted cyclopentadiene as represented by the following respective formulas:



wherein R_1 and R_2 are respectively a hydrocarbyl group, and m and n are respectively zero or a positive integer.

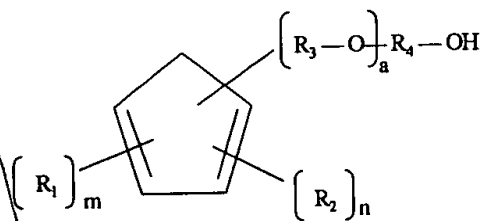
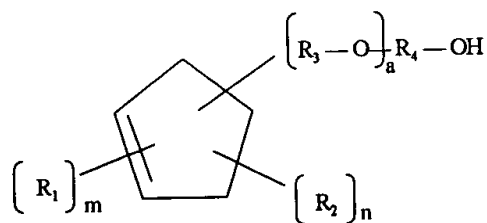
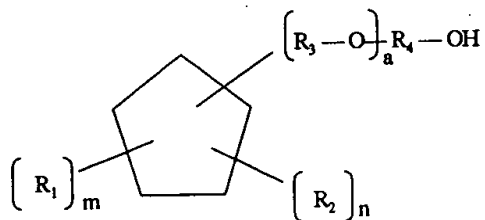
1 3. The magnetic recording medium of claim 1, wherein the lubricant layer includes a
2 hydrocarbyl-substituted cyclopentane, a hydrocarbyl-substituted cyclopentene, or a
3 hydrocarbyl-substituted cyclopentadiene as represented by the following respective formulas:



wherein R'_1 and R'_2 are respectively a functionalized hydrocarbyl group which includes a functional group selected from -OH; $-NH_2$; carboxylic acid; carboxylic ester; phenolic ester; polyether; amide; amine; sulfonamide; thiophosphate; and phosphate, and m and n are respectively zero or a positive integer.

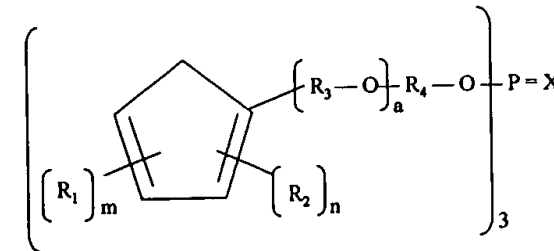
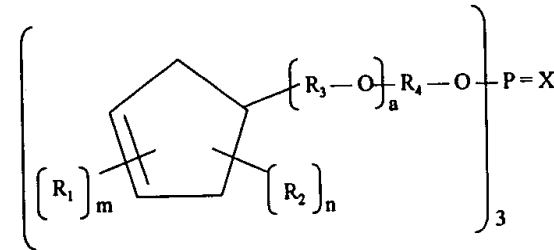
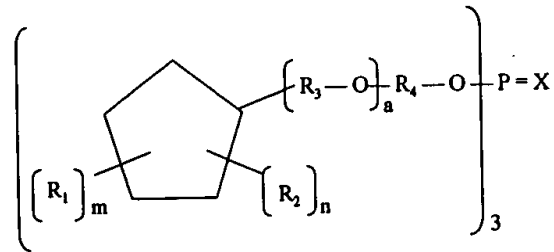
1 4. The magnetic recording medium of claim 1, wherein the derivatives of the
2 hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, or hydrocarbyl-
3 substituted cyclopentadiene include at least one functional group selected from the group
4 consisting of hydroxy, carboxylic acid, amine, carboxylic ester, carboxylic amide, phosphate,
5 and sulfur-containing groups.

5. The magnetic recording medium of claim 4, wherein the derivatives of the hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene are represented by the following respective formulas:



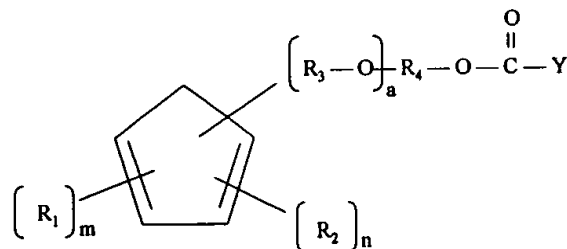
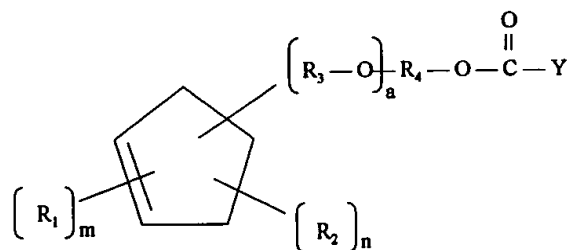
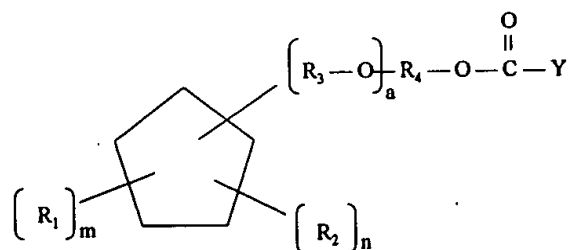
wherein a is 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10; m and n are zero or a positive integer; R_1 , R_2 , R_3 , and R_4 are individually a hydrocarbyl group.

6. The magnetic recording medium of claim 4, wherein the derivatives of the hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene are represented by the following respective formulas:

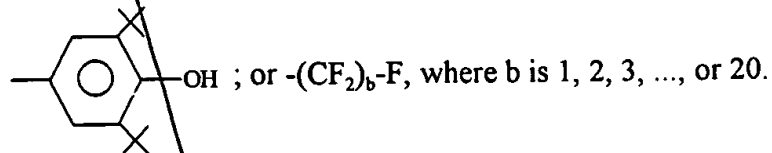


wherein a is 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10; m and n are zero or a positive integer; R_1 , R_2 , R_3 , and R_4 are individually a hydrocarbyl group; X is either oxygen or sulfur.

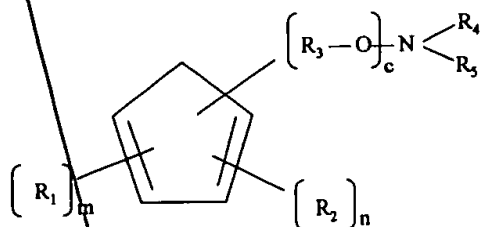
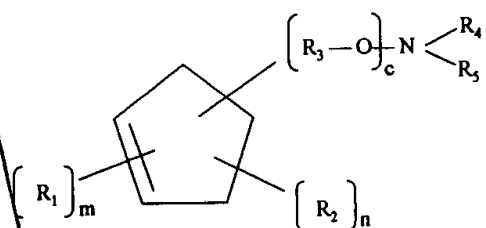
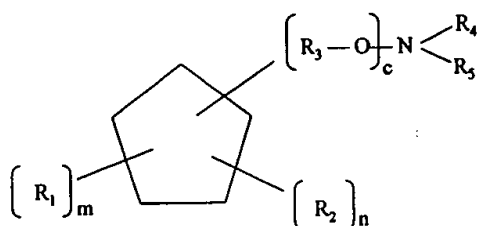
7. The magnetic recording medium of claim 4, wherein the derivatives of the hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene are represented by the following respective formulas:



wherein a is 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10; m and n are zero or a positive integer; R_1 , R_2 , R_3 , and R_4 are individually a hydrocarbyl group; Y is -OH; -NH₂,

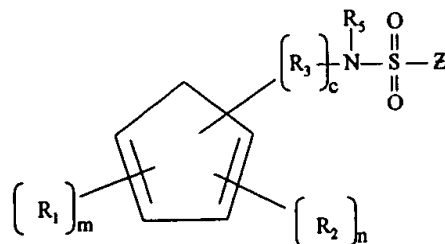
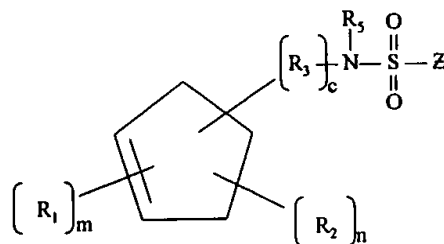
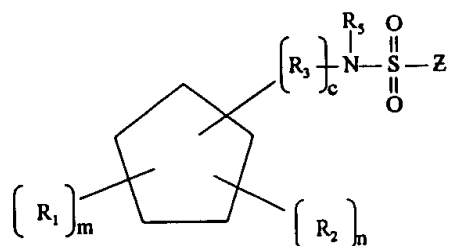


8. The magnetic recording medium of claim 4, wherein the derivatives of the hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene are represented by the following respective formulas:



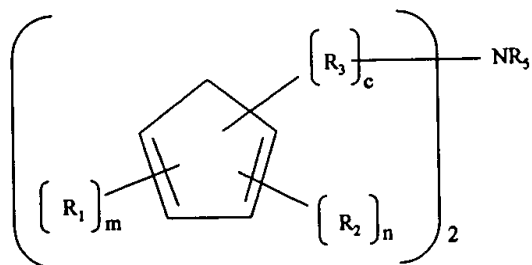
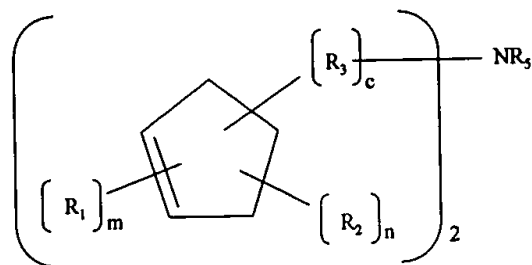
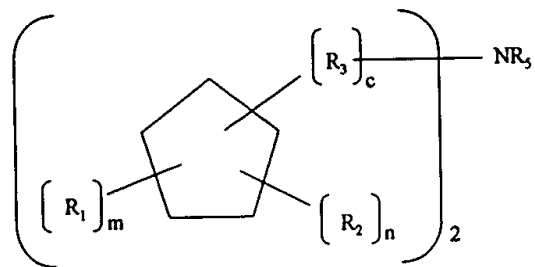
wherein c is 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10; m and n are zero or a positive integer; R_1 , R_2 , and R_3 are individually a hydrocarbyl group; R_4 and R_5 individually are hydrogen or hydrocarbyl.

9. The magnetic recording medium of claim 4, wherein the derivatives of the hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene are represented by the following respective formulas:



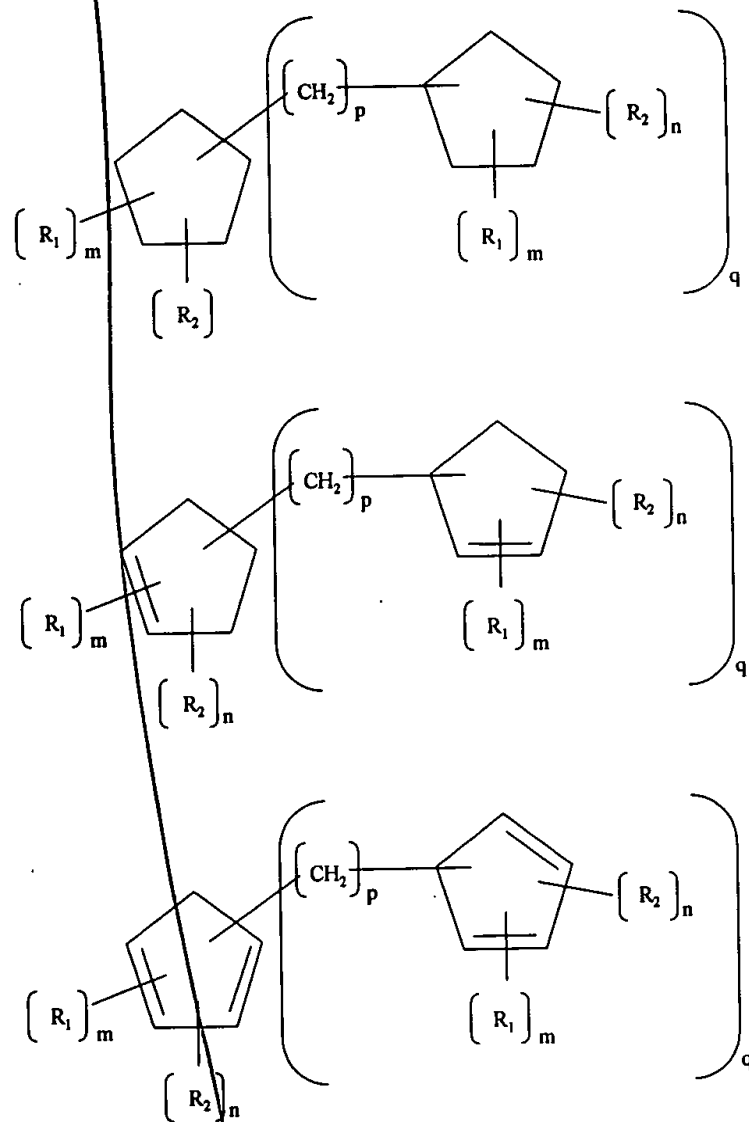
wherein c is 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10; m and n are zero or a positive integer; R_1 , R_2 , and R_3 are individually a hydrocarbyl group; R_3 is hydrogen or hydrocarbyl; Z is hydrocarbyl or $-(CF_2)_b-F$ where b is 1, 2, 3, ..., or 20.

10. The magnetic recording medium of claim 4, wherein the derivatives of the hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene are represented by the following respective formulas:



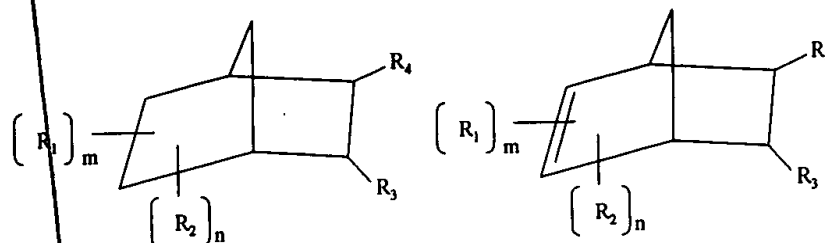
wherein c is 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10; m and n are zero or a positive integer; R_1 , R_2 , and R_3 are individually a hydrocarbyl group; R_5 is hydrogen or hydrocarbyl.

11. The magnetic recording medium of claim 4, wherein the derivatives of the hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene are represented by the following respective formulas:



wherein p is 1, 2, 3, ..., or 10; q is 1, 2, 3, ..., or 10; m and n are zero or a positive integer; R_1 and R_2 are individually a hydrocarbyl group.

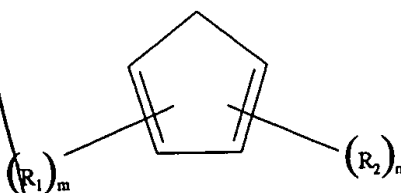
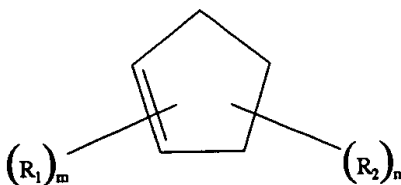
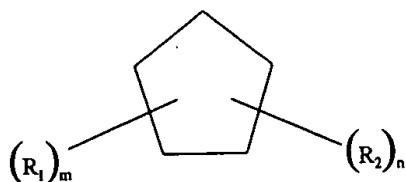
1 12. The magnetic recording medium of claim 4, wherein the derivatives of the
2 hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, or hydrocarbyl-
3 substituted cyclopentadiene are represented by the following respective formulas:



4 wherein m and n are zero or a positive integers; R_1 and R_2 individually are a
5 hydrocarbyl group; R_3 and R_4 individually are hydrocarbyl, hydroxy, nitrile, carboxylic acid,
6 carboxylic amide, or carboxylic ester.

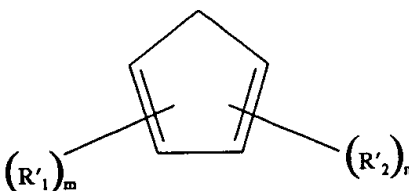
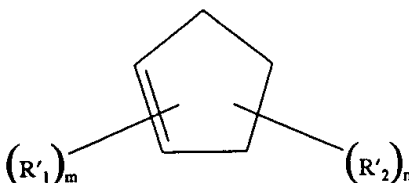
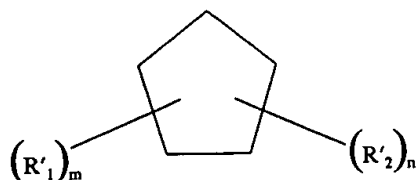
1 13. The magnetic recording medium of claim 1, further comprising:
2 a protective layer between the magnetic layer and the lubricant layer.

1 14. The magnetic recording medium of claim 13, wherein the lubricant layer includes a
2 hydrocarbyl-substituted cyclopentane, a hydrocarbyl-substituted cyclopentene, or a
3 hydrocarbyl-substituted cyclopentadiene as represented by the following respective formulas:



4 wherein R_1 and R_2 are respectively a hydrocarbyl group, and m and n are respectively
5 zero or a positive integer.

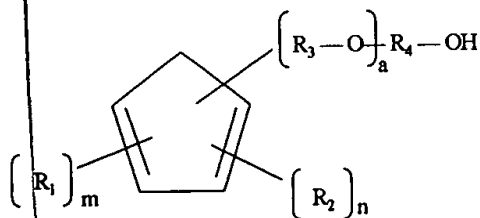
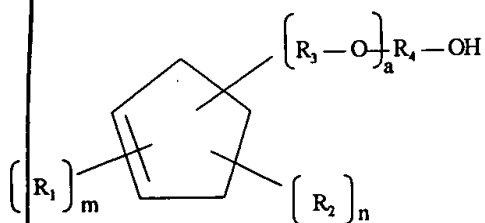
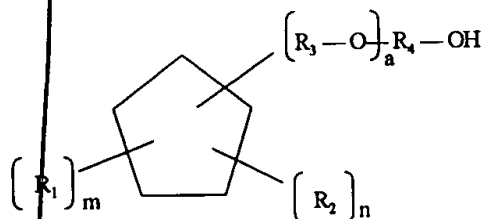
15. The magnetic recording medium of claim 13, wherein the lubricant layer includes a hydrocarbyl-substituted cyclopentane, a hydrocarbyl-substituted cyclopentene, or a hydrocarbyl-substituted cyclopentadiene as represented by the following respective formulas:



wherein R'_1 and R'_2 are respectively a functionalized hydrocarbyl group which includes a functional group selected from -OH; -NH₂; carboxylic acid; carboxylic ester; phenolic ester; polyether; amide; amine; sulfonamide; thiophosphate; and phosphate, and m and n are respectively zero or a positive integer.

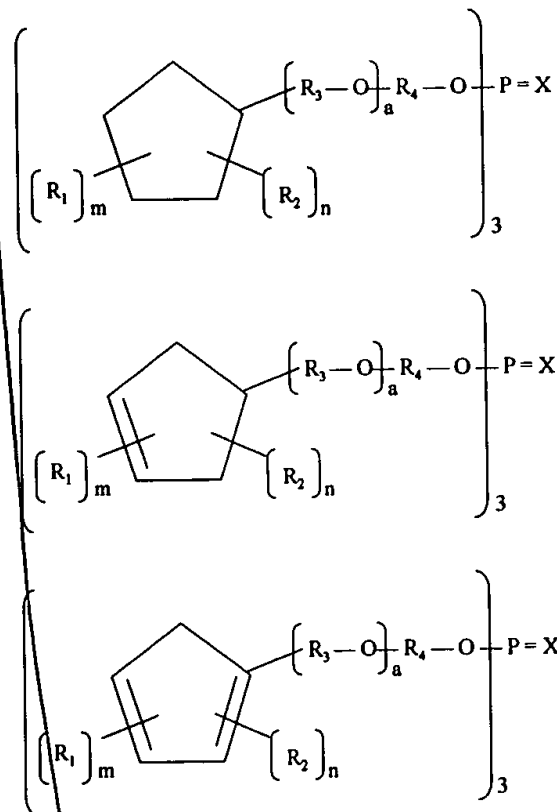
16. The magnetic recording medium of claim 13, wherein the derivatives of the hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene include at least one functional group selected from the group consisting of hydroxy, carboxylic acid, amine, carboxylic ester, carboxylic amide, phosphate, and sulfur-containing groups.

1 17. The magnetic recording medium of claim 16, wherein the derivatives of the
2 hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, or hydrocarbyl-
3 substituted cyclopentadiene are represented by the following respective formulas:



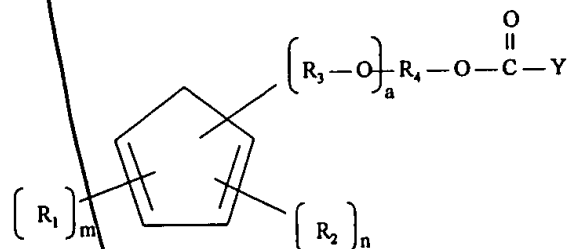
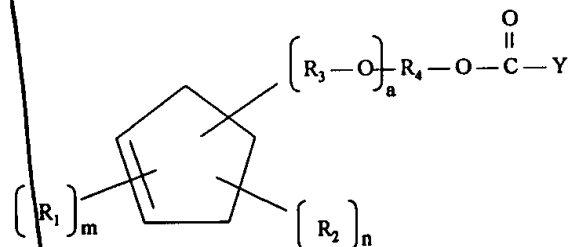
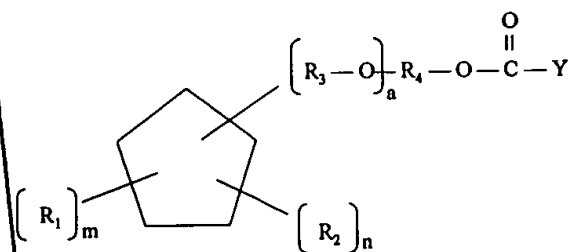
4 wherein a is 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10; m and n are zero or a positive integer;
5 R_1 , R_2 , R_3 , and R_4 are individually a hydrocarbyl group.

18. The magnetic recording medium of claim 16, wherein the derivatives of the hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene are represented by the following respective formulas:

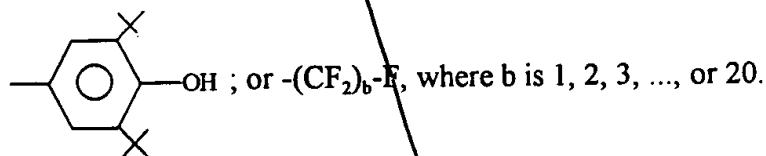


wherein a is 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10; m and n are zero or a positive integer; R_1 , R_2 , R_3 , and R_4 are individually a hydrocarbyl group; X is either oxygen or sulfur.

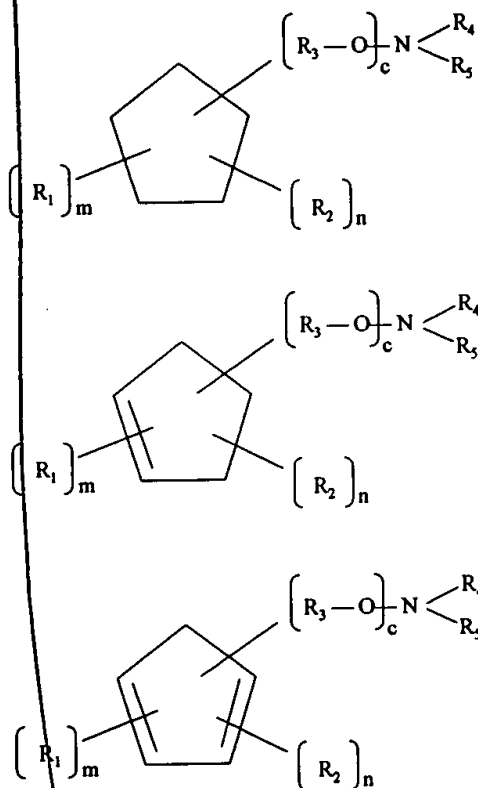
19. The magnetic recording medium of claim 16, wherein the derivatives of the hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene are represented by the following respective formulas:



wherein a is 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10; m and n are zero or a positive integer; R_1 , R_2 , R_3 , and R_4 are individually a hydrocarbyl group; Y is -OH; -NH₂,

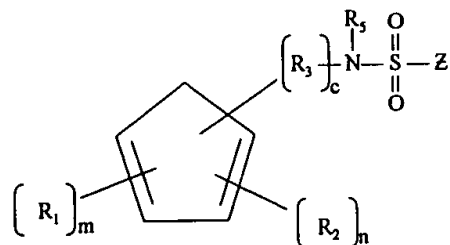
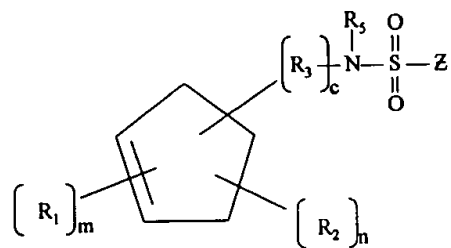
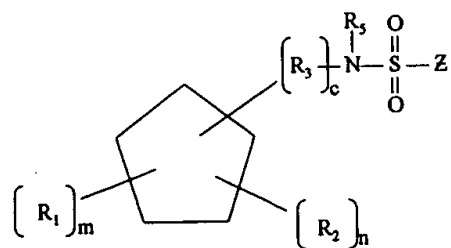


20. The magnetic recording medium of claim 16, wherein the derivatives of the hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene are represented by the following respective formulas:



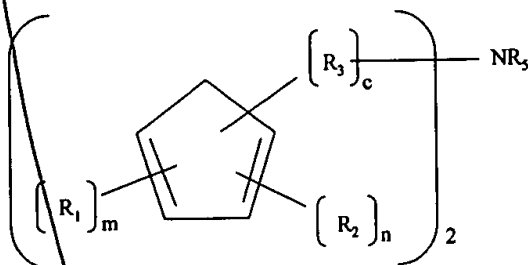
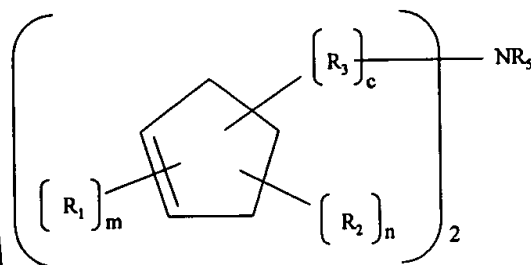
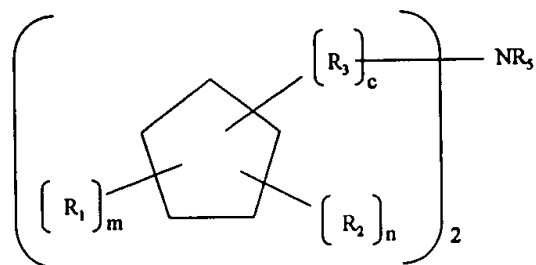
wherein c is 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10; m and n are zero or a positive integer; R_1 , R_2 , and R_3 are individually a hydrocarbyl group; R_4 and R_5 individually are hydrogen or hydrocarbyl.

21. The magnetic recording medium of claim 16, wherein the derivatives of the hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene are represented by the following respective formulas:



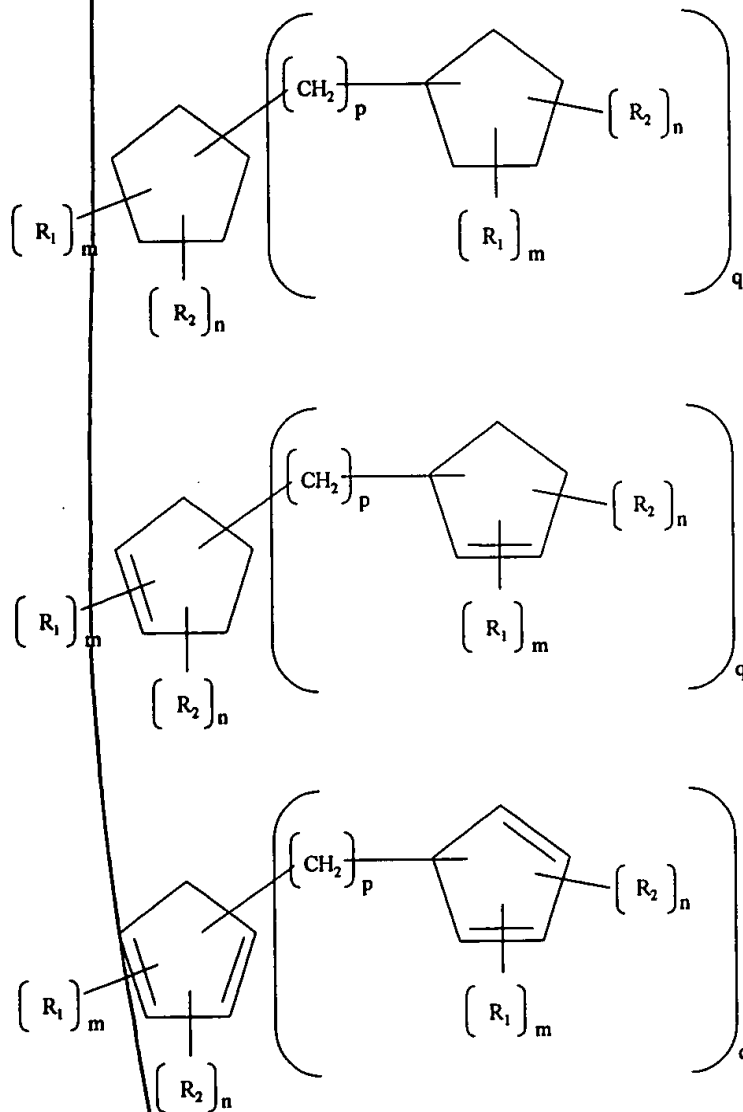
wherein c is 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10; m and n are zero or a positive integer; R_1 , R_2 , and R_3 are individually a hydrocarbyl group; R_3 is hydrogen or hydrocarbyl; Z is hydrocarbyl or $-(CF_2)_b-F$ where b is 1, 2, 3, ..., or 20.

22. The magnetic recording medium of claim 16, wherein the derivatives of the hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene are represented by the following respective formulas:



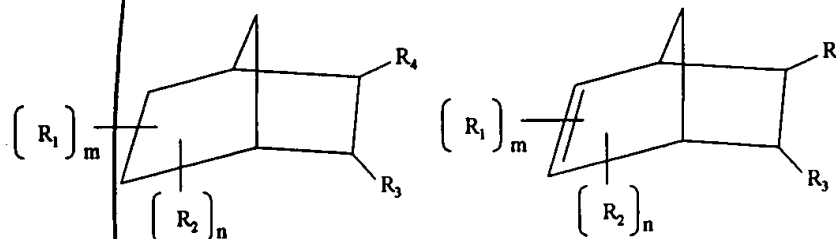
wherein c is 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10; m and n are zero or a positive integer; R_1 , R_2 , and R_3 are individually a hydrocarbyl group; R_5 is hydrogen or hydrocarbyl.

23. The magnetic recording medium of claim 16, wherein the derivatives of the hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene are represented by the following respective formulas:



wherein p is 1, 2, 3, ..., or 10; q is 1, 2, 3, ..., or 10; m and n are zero or a positive integer; R_1 and R_2 are individually a hydrocarbyl group.

24. The magnetic recording medium of claim 16, wherein the derivatives of the hydrocarbyl-substituted cyclopentane, hydrocarbyl-substituted cyclopentene, or hydrocarbyl-substituted cyclopentadiene are represented by the following respective formulas:



wherein m and n are zero or a positive integers; R_1 and R_2 individually are a hydrocarbyl group; R_3 and R_4 individually are hydrocarbyl, hydroxy, nitrile, carboxylic acid, carboxylic amide, or carboxylic ester.

25. A magnetic head, comprising:

a head; and

a lubricant layer over at least a portion of the head, the lubricant layer including a compound selected from the group consisting of hydrocarbyl substituted cyclopentane, hydrocarbyl substituted cyclopentene, hydrocarbyl substituted cyclopentadiene, and mixtures or derivatives thereof.


26. A data storage/retrieval device, comprising:

a magnetic recording medium including a magnetic layer over a support and a lubricant layer over the magnetic layer, the lubricant layer including a compound selected from the group consisting of hydrocarbyl substituted cyclopentane, hydrocarbyl substituted cyclopentene, hydrocarbyl substituted cyclopentadiene, and mixtures or derivatives thereof; and

a magnetic head adjacent to the magnetic recording medium, the magnetic head sliding on the magnetic recording medium to read and write information on the magnetic recording medium.

1 27. The data storage/retrieval device of claim 26, further comprising:
2 a power supply for applying a voltage across the magnetic recording medium and the
3 magnetic head for reading or writing information on the magnetic recording medium.

1 28. The data storage/retrieval device of claim 26, wherein the device is a computer disk
2 drive.

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 29. A computer, comprising:
a CPU;
a disk drive connected to the CPU so that the disk drive can communicate with the
CPU, the disk drive including:
a magnetic recording medium having a magnetic layer over a support and a lubricant
layer over the magnetic layer, the lubricant layer having a compound selected from the group
consisting of hydrocarbyl substituted cyclopentane, hydrocarbyl substituted cyclopentene,
hydrocarbyl substituted cyclopentadiene, and mixtures or derivatives thereof; and
a magnetic head adjacent to the magnetic recording medium, the magnetic head sliding
on the magnetic recording medium to read and write information on the magnetic recording
medium.

1 30. A method of manufacturing a magnetic recording medium, comprising:
2 providing a non-magnetic support;
3 forming a magnetic layer on the support; and
4 forming a lubricant layer over the magnetic layer, the lubricant layer including a
5 compound selected from the group consisting of hydrocarbyl substituted cyclopentane,
6 hydrocarbyl substituted cyclopentene, hydrocarbyl substituted cyclopentadiene, and mixtures
7 or derivatives thereof.

31. The method of claim 30, further comprising:
forming a protective layer on the magnetic layer between the lubricant layer and the
magnetic layer.

ADD A1

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